

What is claimed is:

1. 1. A broadcast apparatus for broadcasting broadcast data  
2 comprising:

3           acquiring means for acquiring first broadcast data  
4 and a reproduction time period in which the first broadcast  
5 data is to be reproduced by a reception apparatus; and  
6           broadcasting means for repeatedly broadcasting the  
7 first broadcast data from a specific time to an end of  
8 the reproduction time period, the specific time being a  
9 point in time before a start of the reproduction time period,  
10 and a time period between the specific time and the start  
11 of the reproduction time period being a predetermined time  
12 period.

1. 2. The broadcast apparatus of claim 1, wherein  
2           the acquiring means further acquires second  
3 broadcast data which is to be reproduced before the first  
4 broadcast data, and  
5           the broadcasting means repeatedly broadcasts the  
6 second broadcast data until the specific time.

1. 3. The broadcast apparatus of claim 2,  
2           wherein the broadcasting means broadcasts the  
3 second broadcast data on a predetermined bandwidth until  
4 the specific time and broadcasts the first broadcast data  
5 on the predetermined bandwidth from the specific time.

1   4. The broadcast apparatus of claim 1, wherein  
2       the acquiring means further acquires second  
3     broadcast data which is to be reproduced before the first  
4     broadcast data, and

5       the broadcasting means repeatedly broadcasts the  
6     second broadcast data until the start of the reproduction  
7     time period.

1   5. The broadcast apparatus of claim 4,  
2       wherein the broadcasting means broadcasts the  
3     second broadcast data on a predetermined bandwidth until  
4     the specific time and broadcasts the second broadcast data  
5     and the first broadcast data on the predetermined bandwidth  
6     from the specific time to the start of the reproduction  
7     period.

1   6. The broadcast apparatus of claim 4,  
2       wherein the broadcasting means broadcasts the  
3     second broadcast data on a predetermined bandwidth until  
4     the specific time and broadcasts the second broadcast data  
5     on the predetermined bandwidth from the specific time to  
6     the start of the reproduction period.

1   7. The broadcast apparatus of claim 1 further comprising:  
2       cache instruction broadcasting means for  
3     broadcasting a cache instruction before the start of the  
4     reproduction time period, the cache instruction

5 instructing the reception apparatus to cache the first  
6 broadcast data; and

7 reproduction instruction broadcasting means for  
8 broadcasting a reproduction instruction during the  
9 reproduction time period, the reproduction instruction  
10 instructing the reception apparatus to reproduce, when  
11 the first broadcast data has been cached according to the  
12 cache instruction, the cached broadcast data.

1 8. The broadcast apparatus of claim 7, wherein  
2 the cache instruction broadcasting means  
3 broadcasts the cache instruction to instruct the reception  
4 apparatus to perform the caching by accumulating the first  
5 broadcast data, and

6 the reproduction instruction broadcasting means  
7 broadcasts the reproduction instruction to instruct the  
8 reception apparatus to reproduce, (a) when the first  
9 broadcast data has been accumulated according to the cache  
10 instruction, the accumulated broadcast data, and (b) when  
11 the first broadcast data has not been accumulated according  
12 to the cache instruction, the first broadcast data  
13 broadcast by the broadcasting means.

1 9. The broadcast apparatus of claim 7, wherein  
2 the cache instruction broadcasting means  
3 broadcasts the cache instruction to instruct the reception  
4 apparatus to perform the caching by storing the first

5 broadcast data into a cache memory when the first broadcast  
6 data has been stored in a predetermined storage medium,  
7 and

8 the reproduction instruction broadcasting means  
9 broadcasts the reproduction instruction to instruct the  
10 reception apparatus to reproduce, (a) when the first  
11 broadcast data has been stored in the cache memory according  
12 to the cache instruction, the first broadcast data stored  
13 in the cache memory, and (b) when the first broadcast data  
14 has not been stored in the cache memory according to the  
15 cache instruction, the first broadcast data stored in the  
16 predetermined storage medium or the first broadcast data  
17 broadcast by the broadcasting means.

1 10. A broadcast apparatus for multiplexing and broadcasting  
2 program data which is to be reproduced by a reception  
3 apparatus soon after receipt and additional data which  
4 corresponds to the program data, the broadcast apparatus  
5 comprising:

6 acquiring means for acquiring first program data,  
7 first additional data corresponding to the first program  
8 data, a broadcast time period of the first program data,  
9 and second program data which is to be broadcast before  
10 the first program data;

11 multiplexing means for repeatedly multiplexing the  
12 first additional data with the second program data from  
13 a specific time to a start of the broadcast time period

14 and repeatedly multiplexing the first additional data with  
15 the first program data during the broadcast time period,  
16 the specific time being a point in time before the start  
17 of the broadcast time period, and a time period between  
18 the specific time and the start of the broadcast time period  
19 being a predetermined time period; and  
20 broadcasting means for broadcasting the data  
21 multiplexed by the multiplexing means.

1 11. The broadcast apparatus of claim 10, wherein  
2 the acquiring means further acquires second  
3 additional data corresponding to the second program data,  
4 and

5 the multiplexing means repeatedly multiplexes the  
6 second additional data with the second program data until  
7 the specific time.

1 12. The broadcast apparatus of claim 11,  
2 wherein the multiplexing means performs the  
3 multiplexing for the second additional data on a  
4 predetermined bandwidth until the specific time and  
5 performs the multiplexing for the first additional data  
6 on the predetermined bandwidth from the specific time.

1 13. The broadcast apparatus of claim 10, wherein  
2 the acquiring means further acquires second  
3 additional data corresponding to the second program data,

4 and

5           the multiplexing means repeatedly multiplexes the  
6 second additional data with the second program data until  
7 the start of the broadcast time period.

1 14. The broadcast apparatus of claim 13,  
2           wherein the multiplexing means performs the  
3 multiplexing for the second additional data on a  
4 predetermined bandwidth until the specific time and  
5 performs the multiplexing for the second additional data  
6 and the first additional data on the predetermined  
7 bandwidth from the specific time to the start of the  
8 broadcast time period.

1 15. The broadcast apparatus of claim 13,  
2           wherein the multiplexing means performs the  
3 multiplexing for the second additional data on a  
4 predetermined bandwidth until the specific time and  
5 performs the multiplexing for the second additional data  
6 on the predetermined bandwidth from the specific time to  
7 the start of the broadcast time period.

1 16. The broadcast apparatus of claim 10 further comprising:  
2           cache instruction broadcasting means for  
3 broadcasting a cache instruction before the start of the  
4 broadcast time period, the cache instruction instructing  
5 the reception apparatus to cache the first additional data;

6 and

7       use instruction broadcasting means for  
8 broadcasting a use instruction after the start of the  
9 broadcast time period, the use instruction instructing  
10 the reception apparatus to use, when the first additional  
11 data is cached according to the cache instruction, the  
12 cached additional data.

1 17. The broadcast apparatus of claim 16, wherein

2       the cache instruction broadcasting means  
3 broadcasts the cache instruction to instruct the reception  
4 apparatus to perform the caching by accumulating the first  
5 additional data, and

6       the use instruction broadcasting means broadcasts  
7 the use instruction to instruct the reception apparatus  
8 to use, (a) when the first additional data has been  
9 accumulated according to the cache instruction, the  
10 accumulated first additional data, and (b) when the first  
11 additional data has not been accumulated according to the  
12 cache instruction, the first additional data broadcast  
13 by the broadcasting means.

1 18. The broadcast apparatus of claim 16, wherein

2       the cache instruction broadcasting means  
3 broadcasts the cache instruction to instruct the reception  
4 apparatus to perform the caching by storing the first  
5 additional data into a cache memory when the first

6 additional data has been stored in a predetermined storage  
7 medium, and

8 the use instruction broadcasting means broadcasts  
9 the use instruction to instruct the reception apparatus  
10 to use, (a) when the first additional data has been stored  
11 in the cache memory according to the cache instruction,  
12 the first additional data stored in the cache memory, and  
13 (b) when the first additional data has not been stored  
14 in the cache memory according to the cache instruction,  
15 the first additional data stored in the predetermined  
16 storage medium.

1 19. The broadcast apparatus of claim 10, wherein  
2 the acquiring means further acquires second  
3 additional data corresponding to the second program data  
4 and a broadcast time period of the second program data,  
5 the broadcast apparatus further comprises judging  
6 means for judging whether the broadcast time period of  
7 the second program data is longer than a predetermined  
8 criterion time period, and

9 the multiplexing means,  
10 (a) when the judging means judges that the broadcast  
11 time period of the second program data is longer than the  
12 predetermined criterion time period, repeatedly  
13 multiplexes the second additional data with the second  
14 program data until the specific time, repeatedly  
15 multiplexes the first additional data with the second

16 program data from the specific time to the start of the  
17 broadcast time period of the first program data, and  
18 repeatedly multiplexes the first additional data with the  
19 first program data during the broadcast time period of  
20 the first program data, and

21 (b) when the judging means judges that the broadcast  
22 time period of the second program data is no longer than  
23 the predetermined criterion time period, repeatedly  
24 multiplexes the second additional data with the second  
25 program data until the specific time, repeatedly  
26 multiplexes the second additional data and the first  
27 additional data with the second program data from the  
28 specific time to the start of the broadcast time period  
29 of the first program data, and repeatedly multiplexes the  
30 first additional data with the first program data during  
31 the broadcast time period of the first program data.

1 20. The broadcast apparatus of claim 10, wherein  
2 the acquiring means further acquires second  
3 additional data corresponding to the second program data  
4 and a broadcast time period of the second program data,  
5 the broadcast apparatus further comprises judging  
6 means for judging whether the broadcast time period of  
7 the second program data is longer than a predetermined  
8 criterion time period, and  
9 the multiplexing means  
10 (a) repeatedly multiplexes the second additional

11 data with the second program data until the specific time  
12 so that a bandwidth for the second additional data is  
13 allocated to a predetermined bandwidth,

14 (b) when the judging means judges that the broadcast  
15 time period of the second program data is longer than the  
16 predetermined criterion time period, repeatedly  
17 multiplexes the first additional data with the second  
18 program data from the specific time to the start of the  
19 broadcast time period of the first program data so that  
20 a bandwidth for the first additional data is allocated  
21 to the predetermined bandwidth, and repeatedly multiplexes  
22 the first additional data with the first program data during  
23 the broadcast time period of the first program data, and

24 (c) when the judging means judges that the broadcast  
25 time period of the second program data is no longer than  
26 the predetermined criterion time period, so that a total  
27 bandwidth for the second additional data and the first  
28 additional data is allocated to the predetermined bandwidth,  
29 repeatedly multiplexes the second additional data and the  
30 first additional data with the second program data from  
31 the specific time to the start of the broadcast time period  
32 of the first program data, and repeatedly multiplexes the  
33 first additional data with the first program data during  
34 the broadcast time period of the first program data.

- 1 21. The broadcast apparatus of claim 10, wherein  
2 the first additional data acquiring means further

3 acquires second additional data corresponding to the second  
4 program data and a broadcast time period of the second  
5 program data,

6 the broadcast apparatus further comprises judging  
7 means for judging whether the broadcast time period of  
8 the second program data is longer than a predetermined  
9 criterion time period, and

10 the multiplexing means

11 (a) repeatedly multiplexes the second additional  
12 data with the second program data until the specific time  
13 so that a bandwidth for the second additional data is  
14 allocated to a predetermined bandwidth,

15 (b) when the judging means judges that the broadcast  
16 time period of the second program data is longer than the  
17 predetermined criterion time period, so that a bandwidth  
18 for the first additional data is allocated to the  
19 predetermined bandwidth, repeatedly multiplexes the first  
20 additional data with the second program data from the  
21 specific time to the start of the broadcast time period  
22 of the first program data and repeatedly multiplexes the  
23 first additional data with the first program data during  
24 the broadcast time period of the first program data, and

25 (c) when the judging means judges that the broadcast  
26 time period of the second program data is no longer than  
27 the predetermined criterion time period, repeatedly  
28 multiplexes the second additional data and the first  
29 additional data with the second program data from the

30 specific time to the start of the broadcast time period  
31 of the first program data so that a total bandwidth for  
32 the second additional data and the first additional data  
33 is increased by adding a bandwidth for the first additional  
34 data to the predetermined bandwidth and repeatedly  
35 multiplexes the first additional data with the first  
36 program data during the broadcast time period of the first  
37 program data so that a bandwidth for the first additional  
38 data is allocated to the predetermined bandwidth.

1 22. The broadcast apparatus of any of claim 19, 20, and  
2 21,

3 wherein, when the judging means judges that the  
4 broadcast time period of the second program data is no  
5 longer than the predetermined criterion time period, the  
6 multiplexing means repeatedly multiplexes the second  
7 additional data and the first additional data with the  
8 second program data during the broadcast time period of  
9 the second program data.

1 23. The broadcast apparatus of any of claim 19, 20, and  
2 21 further comprising:

3 criterion time period determining means for  
4 determining the predetermined criterion time period to  
5 be used by the judging means by multiplying a time period  
6 of a broadcast cycle of additional data by a predetermined  
7 coefficient.

1    24. The broadcast apparatus of claim 10, wherein  
2         the acquiring means further acquires second  
3         additional data corresponding to the second program data  
4         and a broadcast time period of the second program data,  
5                 the second additional data is updated during the  
6         broadcast time period of the second program data,  
7                 the broadcast apparatus further comprises judging  
8         means for judging whether a time period from the last update  
9         time of the second additional data to the start of the  
10      broadcast time period of the first program data is longer  
11      than a predetermined criterion time period, and  
12                 the multiplexing means,  
13                 (a) when the judging means judges that the time  
14         period from the last update time of the second additional  
15         data to the start of the broadcast time period of the first  
16         program data is longer than the predetermined criterion  
17         time period, repeatedly multiplexes the second additional  
18         data with the second program data until the specific time,  
19         repeatedly multiplexes the first additional data with the  
20         second program data from the specific time to the start  
21         of the broadcast time period of the first program data,  
22         and repeatedly multiplexes the first additional data with  
23         the first program data during the broadcast time period  
24         of the first program data, and  
25                 (b) when the judging means judges that the time  
26         period from the last update time of the second additional

27 data to the start of the broadcast time period of the first  
28 program data is no longer than the predetermined criterion  
29 time period, repeatedly multiplexes the second additional  
30 data with the second program data until the specific time,  
31 repeatedly multiplexes the second additional data and the  
32 first additional data with the second program data from  
33 the specific time to the start of the broadcast time period  
34 of the first program data, and repeatedly multiplexes the  
35 first additional data with the first program data during  
36 the broadcast time period of the first program data.

1 25. The broadcast apparatus of claim 10, wherein  
2 the acquiring means further acquires second  
3 additional data corresponding to the second program data  
4 and a broadcast time period of the second program data,  
5 the second additional data is updated during the  
6 broadcast time period of the second program data,  
7 the broadcast apparatus further comprises judging  
8 means for judging whether a time period from the last update  
9 time of the second additional data to the start of the  
10 broadcast time period of the first program data is longer  
11 than a predetermined criterion time period, and  
12 the multiplexing means  
13 (a) repeatedly multiplexes the second additional  
14 data with the second program data until the specific time  
15 so that a bandwidth for the second additional data is  
16 allocated to a predetermined bandwidth,

17                 (b) when the judging means judges that the time  
18 period from the last update time of the second additional  
19 data to the start of the broadcast time period of the first  
20 program data is longer than the predetermined criterion  
21 time period, repeatedly multiplexes the first additional  
22 data with the second program data from the specific time  
23 to the start of the broadcast time period of the first  
24 program data so that a bandwidth for the first additional  
25 data is allocated to the predetermined bandwidth and  
26 repeatedly multiplexes the first additional data with the  
27 first program data during the broadcast time period of  
28 the first program data, and

29                 (c) when the judging means judges that the time  
30 period from the last update time of the second additional  
31 data to the start of the broadcast time period of the first  
32 program data is no longer than the predetermined criterion  
33 time period, repeatedly multiplexes the second additional  
34 data and the first additional data with the second program  
35 data from the specific time to the start of the broadcast  
36 time period of the first program data so that a total  
37 bandwidth for the second additional data and the first  
38 additional data is allocated to the predetermined bandwidth  
39 and repeatedly multiplexes the first additional data with  
40 the first program data during the broadcast time period  
41 of the first program data.

1 26. The broadcast apparatus of claim 10, wherein

the acquiring means further acquires second additional data corresponding to the second program data and a broadcast time period of the second program data, the second additional data is updated during the broadcast time period of the second program data, the broadcast apparatus further comprises judging means for judging whether a time period from a last update time of the second additional data to the start of the broadcast time period of the first program data is longer than a predetermined criterion time period, and the multiplexing means

(a) repeatedly multiplexes the second additional data with the second program data until the specific time so that a bandwidth for the second additional data is allocated to a predetermined bandwidth,

(b) when the judging means judges that the time period from the last update time of the second additional data to the start of the broadcast time period of the first program data is longer than the predetermined criterion time period, so that a bandwidth for the first additional data is allocated to the predetermined bandwidth, repeatedly multiplexes the first additional data with the second program data from the specific time to the start of the broadcast time period of the first program data and repeatedly multiplexes the first additional data with the first program data during the broadcast time period of the first program data, and

29 (c) when the judging means judges that the time  
30 period from the last update time of the second additional  
31 data to the start of the broadcast time period of the first  
32 program data is no longer than the predetermined criterion  
33 time period, repeatedly multiplexes the second additional  
34 data and the first additional data with the second program  
35 data from the specific time to the start of the broadcast  
36 time period of the first program data so that a total  
37 bandwidth for the second additional data and the first  
38 additional data is increased by adding a bandwidth for  
39 the first additional data to the predetermined bandwidth  
40 and repeatedly multiplexes the first additional data with  
41 the first program data during the broadcast time period  
42 of the first program data so that a bandwidth for the first  
43 additional data is allocated to the predetermined  
44 bandwidth.

1 27. The broadcast apparatus of any of claim 24, 25, and  
2 26,

3               wherein, when the judging means judges that the time  
4 period from the last update time of the second additional  
5 data to the start of the broadcast time period of the first  
6 program data is no longer than the predetermined criterion  
7 time period, the multiplexing means repeatedly multiplexes  
8 the second additional data and the first additional data  
9 with the second program data during the time period from  
10 the last update time of the second additional data to the

11 start of the broadcast time period of the first program  
12 data.

1 28. The broadcast apparatus of any of claim 24, 25, and  
2 26 further comprising:

3 criterion time period determining means for  
4 determining the predetermined criterion time period to  
5 be used by the judging means by multiplying a time period  
6 of a broadcast cycle of additional data by a predetermined  
7 coefficient.

1 29. The broadcast apparatus of claim 10, wherein  
2 the acquiring means further acquires second  
3 additional data corresponding to the second program data,  
4 the broadcast apparatus further comprises judging  
5 means for judging whether the broadcast time period is  
6 shorter than a predetermined criterion time period, and  
7 the multiplexing means,

8 (a) when the judging means judges that the broadcast  
9 time period is shorter than the predetermined criterion  
10 time period, repeatedly multiplexes the second additional  
11 data with the second program data until the specific time,  
12 repeatedly multiplexes the first additional data with the  
13 second program data from the specific time to the start  
14 of the broadcast time period, and repeatedly multiplexes  
15 the first additional data with the first program data during  
16 the broadcast time period, and

17                         (b) when the judging means judges that the broadcast  
18                         time period is no shorter than the predetermined criterion  
19                         time period, repeatedly multiplexes the second additional  
20                         data with the second program data until the start of the  
21                         broadcast time period and repeatedly multiplexes the first  
22                         additional data with the first program data during the  
23                         broadcast time period.

1                         30. The broadcast apparatus of claim 10, wherein  
2                         the acquiring means further acquires second  
3                         additional data corresponding to the second program data,  
4                         the first additional data is updated during the  
5                         broadcast time period of the first program data,  
6                         the broadcast apparatus further comprises judging  
7                         means for judging whether a time period from the start  
8                         of the broadcast time period to the first update time of  
9                         the first additional data is longer than a predetermined  
10                        criterion time period, and  
11                         the multiplexing means,  
12                         (a) when the judging means judges that the time  
13                         period from the start of the broadcast time period to the  
14                         first update time of the first additional data is shorter  
15                         than the predetermined criterion time period, repeatedly  
16                         multiplexes the second additional data with the second  
17                         program data until the specific time, repeatedly  
18                         multiplexes the first additional data with the second  
19                         program data from the specific time to the start of the

20 broadcast time period, and repeatedly multiplexes the first  
21 additional data with the first program data during the  
22 broadcast time period, and

23 (b) when the judging means judges that the time  
24 period from the start of the broadcast time period to the  
25 first update time of the first additional data is no shorter  
26 than the predetermined criterion time period, repeatedly  
27 multiplexes the second additional data with the second  
28 program data until the start of the broadcast time period  
29 and repeatedly multiplexes the first additional data with  
30 the first program data during the broadcast time period.

1 31. The broadcast apparatus of any of claim 29 and 30 further  
2 comprising:

3 criterion time period determining means for  
4 determining the predetermined criterion time period to  
5 be used by the judging means by multiplying a time period  
6 of a broadcast cycle of additional data by a predetermined  
7 coefficient.

1 32. The broadcast apparatus of claim 10, wherein  
2 the acquiring means further acquires second  
3 additional data corresponding to the second program data,  
4 the broadcast apparatus has judgement information  
5 which indicates whether the multiplexing for the first  
6 additional data is to be started previous to the start  
7 of the broadcast time period, and

8           the multiplexing means,  
9           (a) when the judgement information indicates that  
10          the multiplexing is to be started previously, repeatedly  
11          multiplexes the second additional data with the second  
12          program data until the specific time, repeatedly  
13          multiplexes the first additional data with the second  
14          program data from the specific time to the start of the  
15          broadcast time period, and repeatedly multiplexes the first  
16          additional data with the first program data during the  
17          broadcast time period, and

18           (b) when the judgement information indicates that  
19          the multiplexing is not to be started previously,  
20          repeatedly multiplexes the second additional data with  
21          the second program data until the start of the broadcast  
22          time period and repeatedly multiplexes the first additional  
23          data with the first program data during the broadcast time  
24          period.

1        33. A broadcast apparatus for multiplexing and broadcasting  
2        program data which is to be reproduced by a reception  
3        apparatus soon after receipt and additional data  
4        corresponding to the program data, the broadcast apparatus  
5        comprising:

6           acquiring means for acquiring first program data,  
7        first additional data corresponding to the first program  
8        data, a broadcast time period of the first program data,  
9        second program data to be broadcast before the first program

10 data, second additional data corresponding to the second  
11 program data, and a broadcast time period of the second  
12 program data;

13 judging means for judging, for each of the broadcast  
14 time period of the first program data and the broadcast  
15 time period of the second program data, whether the  
16 broadcast time period is shorter than a predetermined  
17 criterion time period;

18 multiplexing means for,

19 (a) in a first case where the broadcast time period  
20 of the first program data is shorter than the predetermined  
21 criterion time period and the broadcast time period of  
22 the second program data is no shorter than the predetermined  
23 criterion time period, repeatedly multiplexing the second  
24 additional data with the second program data until a  
25 specific time, repeatedly multiplexing the first  
26 additional data with the second program data from the  
27 specific time to a start of the broadcast time period of  
28 the first program data, and repeatedly multiplexing the  
29 first additional data with the first program data during  
30 the broadcast time period of the first program data, the  
31 specific time being a point in time before the start of  
32 the broadcast time period of the first program data, and  
33 a time period between the specific time and the start of  
34 the broadcast time period of the first program data being  
35 a predetermined time period,

36 (b) in a second case where the broadcast time period

37 of the first program data and the broadcast time period  
38 of the second program data are each shorter than the  
39 predetermined criterion time period, repeatedly  
40 multiplexing the second additional data and the first  
41 additional data with the second program data from the  
42 specific time to the start of the broadcast time period  
43 of the first program data and repeatedly multiplexing the  
44 first additional data with the first program data during  
45 the broadcast time period of the first program data, and

46 (c) in a third case where the broadcast time period  
47 of the first program data is no shorter than the  
48 predetermined criterion time period, regardless of whether  
49 the broadcast time period of the second program data is  
50 shorter than the predetermined criterion time period,  
51 repeatedly multiplexing the second additional data with  
52 the second program data until the start of the broadcast  
53 time period of the first program data and repeatedly  
54 multiplexing the first additional data with the first  
55 program data during the broadcast time period of the first  
56 program data; and

57 broadcasting means for broadcasting the data  
58 multiplexed by the multiplexing means.

1 34. The broadcast apparatus of claim 33, wherein  
2 the multiplexing means  
3 (a) repeatedly multiplexes the second additional  
4 data with the second program data until the specific time

5 so that a bandwidth for the second additional data is  
6 allocated to a predetermined bandwidth,

7 (b) in the first case, repeatedly multiplexes the  
8 first additional data with the second program data from  
9 the specific time to the start of the broadcast time period  
10 of the first program data so that a bandwidth for the first  
11 additional data is allocated to the predetermined bandwidth,  
12 and

13 (c) in the second case, repeatedly multiplexes the  
14 second additional data and the first additional data with  
15 the second program data from the specific time to the start  
16 of the broadcast time period of the first program data  
17 so that a total bandwidth for the first additional data  
18 and the first additional data is allocated to the  
19 predetermined bandwidth.

1 35. The broadcast apparatus of claim 33, wherein  
2 the multiplexing means

3 (a) repeatedly multiplexes the second additional  
4 data with the second program data until the specific time  
5 so that a bandwidth for the second additional data is  
6 allocated to a predetermined bandwidth,

7 (b) in the first case, repeatedly multiplexes the  
8 first additional data with the second program data from  
9 the specific time to the start of the broadcast time period  
10 of the first program data so that a bandwidth for the first  
11 additional data is allocated to the predetermined bandwidth,

12 and

13 (c) in the second case, repeatedly multiplexes the  
14 second additional data and the first additional data with  
15 the second program data from the specific time to the start  
16 of the broadcast time period of the first program data  
17 so that a total bandwidth for the first additional data  
18 and the first additional data is increased by adding a  
19 bandwidth for the first additional data to the  
20 predetermined bandwidth.

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1 36. A broadcast apparatus for multiplexing and broadcasting  
2 program data which is to be reproduced by a reception  
3 apparatus soon after receipt and additional data which  
4 corresponds to the program data, the broadcast apparatus  
5 comprising:

6 acquiring means for acquiring first program data,  
7 first additional data corresponding to the first program  
8 data, a broadcast time period of the first program data,  
9 second program data which is to be broadcast before the  
10 first program data, and second additional data  
11 corresponding to the second program data;

12 accepting means for accepting, from an outside,  
13 judgement on whether multiplexing for the first additional  
14 data is to be started at a specific time or a start time  
15 of the broadcast time period, the specific time being a  
16 point in time before the start of the broadcast time period,  
17 and a time period between the specific time and the start

18 of the broadcast time period being a predetermined time  
19 period;

20 multiplexing means for,

21 (a) in a first case that the accepting means accepts  
22 judgement that the multiplexing for the first additional  
23 data is to be started at the specific time, repeatedly  
24 multiplexing the second additional data with the second  
25 program data until the specific time, repeatedly  
26 multiplexing the first additional data with the second  
27 program data from the specific time to the start of the  
28 broadcast time period, and repeatedly multiplexing the  
29 first additional data with the first program data during  
30 the broadcast time period, and

31 (b) in a second case that the accepting means accepts  
32 judgement that the multiplexing for the first additional  
33 data is to be started at the start time, repeatedly  
34 multiplexing the second additional data with the second  
35 program data until the start of the broadcast time period  
36 and repeatedly multiplexing the first additional data with  
37 the first program data during the broadcast time period;  
38 and

39 broadcasting means for broadcasting the data  
40 multiplexed by the multiplexing means.

1 37. The broadcast apparatus of claim 36,

2 wherein the multiplexing means

3 (a) repeatedly multiplexes the second additional

4 data with the second program data until the specific time  
5 so that a bandwidth for the second additional data is  
6 allocated to a predetermined bandwidth, and

7 (b) in the first case, repeatedly multiplexes the  
8 first additional data with the second program data from  
9 the specific time to the start of the broadcast time period  
10 of the first program data so that a bandwidth for the first  
11 additional data is allocated to the predetermined  
12 bandwidth.

1 38. A broadcast apparatus for multiplexing and broadcasting  
2 program data which is to be reproduced by a reception  
3 apparatus soon after receipt and additional data which  
4 corresponds to the program data, the broadcast apparatus  
5 comprising:

6 acquiring means for acquiring first program data,  
7 first additional data corresponding to the first program  
8 data, a broadcast time period of the first program data,  
9 second program data which is to be broadcast before the  
10 first program data, and second additional data  
11 corresponding to the second program data;

12 accepting means for accepting, from an outside,  
13 judgement on whether multiplexing for the second additional  
14 data is to be continued until the start of the broadcast  
15 time period;

16 multiplexing means for,

17 (a) in a first case that the accepting means accepts

18 judgement that the multiplexing for the second additional  
19 data is not to be continued until the start of the broadcast  
20 time period, repeatedly multiplexing the second additional  
21 data with the second program data until the specific time,  
22 repeatedly multiplexing the first additional data with  
23 the second program data from the specific time to the start  
24 of the broadcast time period, and repeatedly multiplexing  
25 the first additional data with the first program data during  
26 the broadcast time period, and

27 (b) in a second case that the accepting means accepts  
28 judgement that multiplexing for the second additional data  
29 is to be continued until the start of the broadcast time  
30 period, repeatedly multiplexing the second additional data  
31 and the first additional data with the second program data  
32 from the specific time to the start of the broadcast time  
33 period and repeatedly multiplexing the first additional  
34 data with the first program data during the broadcast time  
35 period; and

36 broadcasting means for broadcasting the data  
37 multiplexed by the multiplexing means.

1 39. The broadcast apparatus of claim 38, wherein  
2 the multiplexing means

3 (a) repeatedly multiplexes the second additional  
4 data with the second program data until the specific time  
5 so that a bandwidth for the second additional data is  
6 allocated to a predetermined bandwidth,

7                 (b) in the first case, repeatedly multiplexes the  
8 first additional data with the second program data from  
9 the specific time to the start of the broadcast time period  
10 so that a bandwidth for the first additional data is  
11 allocated to the predetermined bandwidth, and

12                 (c) in the second case, repeatedly multiplexes the  
13 second additional data and the first additional data with  
14 the second program data from the specific time to the start  
15 of the broadcast time period so that a total bandwidth  
16 for the first additional data and the first additional  
17 data is increased by adding a bandwidth for the first  
18 additional data to the predetermined bandwidth.

1 40. The broadcast apparatus of claim 38, wherein

2                 the multiplexing means

3                 (a) repeatedly multiplexes the second additional  
4 data with the second program data until the specific time  
5 so that a bandwidth for the second additional data is  
6 allocated to a predetermined bandwidth,

7                 (b) in the first case, repeatedly multiplexes the  
8 first additional data with the second program data from  
9 the specific time to the start of the broadcast time period  
10 so that a bandwidth for the first additional data is  
11 allocated to the predetermined bandwidth, and

12                 (c) in the second case, repeatedly multiplexes the  
13 second additional data and the first additional data with  
14 the second program data from the specific time to the start

15 of the broadcast time period so that a total bandwidth  
16 for the first additional data and the first additional  
17 data is increased by adding a bandwidth for the first  
18 additional data to the predetermined bandwidth.

1 41. The broadcast apparatus of any of claim 36, 37, 38,  
2 39, and 40,

3 wherein the accepting means further accepts, from  
4 the outside, an indication of the predetermined time  
5 period.

1 42. A reception apparatus for receiving and reproducing  
2 broadcast data which is repeatedly broadcast on a  
3 predetermined bandwidth, the reception apparatus  
4 comprising:

5 receiving means for receiving first broadcast data  
6 to be reproduced during a reproduction time period, the  
7 first broadcast data being repeatedly broadcast from a  
8 point of a predetermined time period before a start of  
9 the reproduction time period to an end of the reproduction  
10 time period;

11 caching means for caching the first broadcast data  
12 until the start of the reproduction time period when the  
13 first broadcast data is received during the predetermined  
14 time period; and

15 reproducing means for reproducing the cached first  
16 broadcast data when the first broadcast data has been cached

17 by the caching means.

1 43. The reception apparatus of claim 42, wherein  
2 the receiving means further receives  
3 a cache instruction to accumulate the first  
4 broadcast data before the start of the reproduction time  
5 period and  
6 a reproduction instruction to reproduce, during the  
7 reproduction time period, (a) when the first broadcast  
8 data has been accumulated, the accumulated first broadcast  
9 data and (b) when the first broadcast data has not been  
10 accumulated, the received first broadcast data,  
11 the caching means accumulates the first broadcast  
12 data before the start of the reproduction time period,  
13 according to the cache instruction and  
14 the reproducing means reproduces, during the  
15 reproduction time period, (a) when the first broadcast  
16 data has been accumulated, the accumulated first broadcast  
17 data, and (b) when the first broadcast data is not  
18 accumulated, the first broadcast data which is received  
19 by the receiving means, according to the reproduction  
20 instruction.

1 44. The reception apparatus of claim 42, wherein  
2 the receiving means further receives  
3 a cache instruction to store the first broadcast  
4 data into a cache memory when the first broadcast data

5 has been stored in a predetermined storage medium before  
6 the start of the reproduction time period and  
7 a reproduction instruction to reproduce, during the  
8 reproduction time period, (a) when the first broadcast  
9 data has been stored in the cache memory, the cached first  
10 broadcast data and (b) when the first broadcast data has  
11 not been stored in the cache memory, the first broadcast  
12 data received by the receiving means or the first broadcast  
13 data stored in the predetermined storage medium,  
14 the caching means stores the first broadcast data  
15 into the cache memory before the start of the reproduction  
16 time period, according to the cache instruction, and  
17 the reproducing means reproduces, during the  
18 reproduction time period, (a) when the first broadcast  
19 data has been stored in the cache memory, the first broadcast  
20 data stored in the cache memory, and (b) when the first  
21 broadcast data is not stored in the cache memory, the first  
22 broadcast data stored in the predetermined storage medium  
23 or the first broadcast data received by the receiving means,  
24 according to the reproduction instruction.

1 45. A reception apparatus for receiving multiplexed data  
2 which is made up of program data which is to be reproduced  
3 by a reception apparatus soon after receipt and additional  
4 data which corresponds to the program data so that a total  
5 bandwidth is allocated to a predetermined bandwidth, the  
6 reception apparatus comprising:

7 receiving means for repeatedly receiving  
8 (a) multiplexed data which is made up of first  
9 additional data corresponding to first program data and  
10 second program data, from a point of a predetermined time  
11 period before a start of a broadcast time period in which  
12 the first program data is to be reproduced to an end of  
13 the broadcast time period, the second program data being  
14 to be reproduced before the first program data, and  
15 (b) multiplexed data which is made up of the first  
16 additional data and the first program data, during the  
17 broadcast time period;  
18 reproducing means for reproducing the first program  
19 data during the broadcast time period;  
20 caching means for caching the first additional data  
21 until the start of the broadcast time period when the  
22 receiving means receives the multiplexed data including  
23 the first additional data during the predetermined time  
24 period; and  
25 using means for using the cached first additional  
26 data when the first additional data has been cached by  
27 the caching means.

1 46. The reception apparatus of claim 45, wherein  
2 the receiving means further receives  
3 a cache instruction to accumulate the first  
4 additional data before the start of the broadcast time  
5 period and

6           a use instruction to use, during the broadcast time  
7 period, (a) when the first broadcast data has not been  
8 accumulated, the accumulated first additional data when  
9 the first additional data has been accumulated and (b)  
10 when the first additional data has not been accumulated,  
11 the received first additional data,

12           the caching means accumulates the first additional  
13 data before the start of the broadcast time period,  
14 according to the cache instruction, and

15           the using means uses, during the broadcast time  
16 period, (a) when the first additional data has been  
17 accumulated, the accumulated first additional data, and  
18 (b) when the first additional data is not accumulated,  
19 the first additional data which is received by the receiving  
20 means, according to the use instruction.

1       47. The reception apparatus of claim 45, wherein  
2           the receiving means further receives  
3           a cache instruction to cache the first additional  
4 data when the first additional data has been stored in  
5 a predetermined storage medium before the start of the  
6 broadcast time period and

7           a use instruction to use, during the broadcast time  
8 period, (a) when the first additional data has been stored  
9 in the cache memory, the first additional data stored in  
10 the cache memory and (b) when the first additional data  
11 has not been stored in the cache memory, the first additional

12 data received by the receiving means or the first additional  
13 data stored in the predetermined storage medium,  
14 the caching means stores the first additional data  
15 into the cache memory before the start of the broadcast  
16 time period, according to the cache instruction, and  
17 the using means uses, during the broadcast time  
18 period, (a) when the first additional data has been stored  
19 in the cache memory, the first additional data stored in  
20 the cache memory, and (b) when the first additional data  
21 is not stored in the cache memory, the first additional  
22 data stored in the predetermined storage medium or the  
23 first additional data received by the receiving means,  
24 according to the use instruction.

1 48. A broadcast method for broadcasting broadcast data  
2 comprising:

3 an acquiring step for acquiring first broadcast data  
4 and a reproduction time period in which the first broadcast  
5 data is to be reproduced by a reception apparatus; and  
6 a broadcasting step for repeatedly broadcasting the  
7 first broadcast data from a specific time to an end of  
8 the reproduction time period, the specific time being a  
9 point in time before a start of the reproduction time period,  
10 and a time period between the specific time and the start  
11 of the reproduction time period being a predetermined time  
12 period.

1       49. A broadcast method for multiplexing and broadcasting  
2       program data which is to be reproduced by a reception  
3       apparatus soon after receipt and additional data which  
4       corresponds to the program data, the broadcast method  
5       comprising:

6               an acquiring step for acquiring first program data,  
7       first additional data corresponding to the first program  
8       data, a broadcast time period of the first program data,  
9       and second program data which is to be broadcast before  
10      the first program data;

11               a multiplexing step for repeatedly multiplexing the  
12      first additional data with the second program data from  
13      a specific time to a start of the broadcast time period  
14      and repeatedly multiplexing the first additional data with  
15      the first program data during the broadcast time period,  
16      the specific time being a point in time before the start  
17      of the broadcast time period, and a time period between  
18      the specific time and the start of the broadcast time period  
19      being a predetermined time period; and

20               a broadcasting step for broadcasting the data  
21      multiplexed in the multiplexing step.

1       50. A broadcast method for multiplexing and broadcasting  
2       program data which is to be reproduced by a reception  
3       apparatus soon after receipt and additional data  
4       corresponding to the program data, the broadcast method  
5       comprising:

6           an acquiring step for acquiring first program data,  
7   first additional data corresponding to the first program  
8   data, a broadcast time period of the first program data,  
9   second program data to be broadcast before the first program  
10   data, second additional data corresponding to the second  
11   program data, and a broadcast time period of the second  
12   program data;

13           a judging step for judging, for each of the broadcast  
14   time period of the first program data and the broadcast  
15   time period of the second program data, whether the  
16   broadcast time period is shorter than a predetermined  
17   criterion time period;

18           a multiplexing step for,

19           (a) in a first case where the broadcast time period  
20   of the first program data is shorter than the predetermined  
21   criterion time period and the broadcast time period of  
22   the second program data is no shorter than the predetermined  
23   criterion time period, repeatedly multiplexing the second  
24   additional data with the second program data until a  
25   specific time, repeatedly multiplexing the first  
26   additional data with the second program data from the  
27   specific time to a start of the broadcast time period of  
28   the first program data, and repeatedly multiplexing the  
29   first additional data with the first program data during  
30   the broadcast time period of the first program data, the  
31   specific time being a point in time before the start of  
32   the broadcast time period of the first program data, and

33 a time period between the specific time and the start of  
34 the broadcast time period of the first program data being  
35 a predetermined time period,

36 (b) in a second case where the broadcast time period  
37 of the first program data and the broadcast time period  
38 of the second program data are each shorter than the  
39 predetermined criterion time period, repeatedly  
40 multiplexing the second additional data and the first  
41 additional data with the second program data from the  
42 specific time to the start of the broadcast time period  
43 of the first program data and repeatedly multiplexing the  
44 first additional data with the first program data during  
45 the broadcast time period of the first program data, and

46 (c) in a third case where the broadcast time period  
47 of the first program data is no shorter than the  
48 predetermined criterion time period, regardless of whether  
49 the broadcast time period of the second program data is  
50 shorter than the predetermined criterion time period,  
51 repeatedly multiplexing the second additional data with  
52 the second program data until the start of the broadcast  
53 time period of the first program data and repeatedly  
54 multiplexing the first additional data with the first  
55 program data during the broadcast time period of the first  
56 program data; and

57 a broadcasting step for broadcasting the data  
58 multiplexed in the multiplexing step.

1       51. A reception method for receiving and reproducing  
2 broadcast data which is repeatedly broadcast on a  
3 predetermined bandwidth, the reception method comprising:

4              a receiving step for receiving first broadcast data  
5 to be reproduced during a reproduction time period, the  
6 first broadcast data being repeatedly broadcast from a  
7 predetermined time period before a start of the  
8 reproduction time period to an end of the reproduction  
9 time period;

10             a caching step for caching the first broadcast data  
11 until the start of the reproduction time period when the  
12 first broadcast data is received during the predetermined  
13 time period; and

14             a reproducing step for reproducing the cached first  
15 broadcast data when the first broadcast data has been cached  
16 by the caching step.

1       52. A broadcast method for receiving multiplexed data which  
2 is made up of program data which is to be reproduced by  
3 a reception apparatus soon after receipt and additional  
4 data which corresponds to the program data so that a total  
5 bandwidth is allocated to a predetermined bandwidth, the  
6 reception method comprising:

7              a receiving step for repeatedly receiving  
8                  (a) multiplexed data which is made up of first  
9 additional data corresponding to first program data and  
10 second program data, from a predetermined time period

11 before a start of a broadcast time period in which the  
12 first program data is to be reproduced to an end of the  
13 broadcast time period, the second program data being to  
14 be reproduced before the first program data, and

15 (b) multiplexed data which is made up of the first  
16 additional data and the first program data, during the  
17 broadcast time period;

18 a reproducing step for reproducing the first program  
19 data during the broadcast time period;

20 a caching step for caching the first additional data  
21 until the start of the broadcast time period when the  
22 multiplexed data including the first additional data is  
23 received during the predetermined time period in the  
24 receiving step; and

25 a using step for using the cached first additional  
26 data when the first additional data has been cached in  
27 the caching step.

1 53. A broadcast program for broadcasting broadcast data,  
2 the broadcast program having a computer execute:

3 an acquiring step for acquiring first broadcast data  
4 and a reproduction time period in which the first broadcast  
5 data is to be reproduced by a reception apparatus; and

6 a broadcasting step for repeatedly broadcasting the  
7 first broadcast data from a specific time to an end of  
8 the reproduction time period, the specific time being a  
9 point in time before a start of the reproduction time period,

10 and a time period between the specific time and the start  
11 of the reproduction time period being a predetermined time  
12 period.

1 54. A broadcast program for multiplexing and broadcasting  
2 program data which is to be reproduced by a reception  
3 apparatus soon after receipt and additional data which  
4 corresponds to the program data, the broadcast program  
5 having a computer execute:

6 an acquiring step for acquiring first program data,  
7 first additional data corresponding to the first program  
8 data, a broadcast time period of the first program data,  
9 and second program data which is to be broadcast before  
10 the first program data;

11 a multiplexing step for repeatedly multiplexing the  
12 first additional data with the second program data from  
13 a specific time to a start of the broadcast time period  
14 and repeatedly multiplexing the first additional data with  
15 the first program data during the broadcast time period,  
16 the specific time being a point in time before the start  
17 of the broadcast time period, and a time period between  
18 the specific time and the start of the broadcast time period  
19 being a predetermined time period; and

20 a broadcasting step for broadcasting the data  
21 multiplexed in the multiplexing step.

1 55. A broadcast program for multiplexing and broadcasting

2 program data which is to be reproduced by a reception  
3 apparatus soon after receipt and additional data  
4 corresponding to the program data, the broadcast program  
5 having a computer execute:

6 an acquiring step for acquiring first program data,  
7 first additional data corresponding to the first program  
8 data, a broadcast time period of the first program data,  
9 second program data to be broadcast before the first program  
10 data, second additional data corresponding to the second  
11 program data, and a broadcast time period of the second  
12 program data;

13 a judging step for judging, for each of the broadcast  
14 time period of the first program data and the broadcast  
15 time period of the second program data, whether the  
16 broadcast time period is shorter than a predetermined  
17 criterion time period;

18 a multiplexing step for,

19 (a) in a first case where the broadcast time period  
20 of the first program data is shorter than the predetermined  
21 criterion time period and the broadcast time period of  
22 the second program data is no shorter than the predetermined  
23 criterion time period, repeatedly multiplexing the second  
24 additional data with the second program data until a  
25 specific time, repeatedly multiplexing the first  
26 additional data with the second program data from the  
27 specific time to a start of the broadcast time period of  
28 the first program data, and repeatedly multiplexing the

29 first additional data with the first program data during  
30 the broadcast time period of the first program data, the  
31 specific time being a point in time before the start of  
32 the broadcast time period of the first program data, and  
33 a time period between the specific time and the start of  
34 the broadcast time period of the first program data being  
35 a predetermined time period,

36 (b) in a second case where the broadcast time period  
37 of the first program data and the broadcast time period  
38 of the second program data are each shorter than the  
39 predetermined criterion time period, repeatedly  
40 multiplexing the second additional data and the first  
41 additional data with the second program data from the  
42 specific time to the start of the broadcast time period  
43 of the first program data and repeatedly multiplexing the  
44 first additional data with the first program data during  
45 the broadcast time period of the first program data, and

46 (c) in a third case where the broadcast time period  
47 of the first program data is no shorter than the  
48 predetermined criterion time period, regardless of whether  
49 the broadcast time period of the second program data is  
50 shorter than the predetermined criterion time period,  
51 repeatedly multiplexing the second additional data with  
52 the second program data until the start of the broadcast  
53 time period of the first program data and repeatedly  
54 multiplexing the first additional data with the first  
55 program data during the broadcast time period of the first

56 program data; and  
57 a broadcasting step for broadcasting the data  
58 multiplexed in the multiplexing step.

1 56. A reception program for receiving and reproducing  
2 broadcast data which is repeatedly broadcast on a  
3 predetermined bandwidth, the reception program having a  
4 computer execute:

5 a receiving step for receiving first broadcast data  
6 to be reproduced during a reproduction time period, the  
7 first broadcast data being repeatedly broadcast from a  
8 predetermined time period before a start of the  
9 reproduction time period to an end of the reproduction  
10 time period;

11 a caching step for caching the first broadcast data  
12 until the start of the reproduction time period when the  
13 first broadcast data is received during the predetermined  
14 time period; and

15 a reproducing step for reproducing the cached first  
16 broadcast data when the first broadcast data has been cached  
17 by the caching step.

1 57. A reception program for receiving multiplexed data  
2 which is made up of program data which is to be reproduced  
3 by a reception apparatus soon after receipt and additional  
4 data which corresponds to the program data so that a total  
5 bandwidth is allocated to a predetermined bandwidth, the

6 reception program having a computer execute:  
7       a receiving step for repeatedly receiving  
8           (a) multiplexed data which is made up of first  
9 additional data corresponding to first program data and  
10 second program data, from a predetermined time period  
11 before a start of a broadcast time period in which the  
12 first program data is to be reproduced to an end of the  
13 broadcast time period, the second program data being to  
14 be reproduced before the first program data, and  
15           (b) multiplexed data which is made up of the first  
16 additional data and the first program data, during the  
17 broadcast time period;  
18        a reproducing step for reproducing the first program  
19 data during the broadcast time period;  
20        a caching step for caching the first additional data  
21 until the start of the broadcast time period when the  
22 multiplexed data including the first additional data is  
23 received during the predetermined time period in the  
24 receiving step; and  
25        a using step for using the cached first additional  
26 data when the first additional data has been cached in  
27 the caching step.